

Student projects reach 'final frontier,' lab helps

by Timothy Anderl, AFRL Headquarters

WRIGHT-PATTERSON AFB, OHIO —

Students from three states recently practiced foresight and imagination that may someday change long duration space flight and life on earth. The students were invited by the Air Force Research Laboratory Materials and Manufacturing Directorate to submit their projects to be tested in outerspace.

The directorate is leading a program to send experimental materials tests up to the International Space Station to test them in the space environment and donated the additional room in the experiment trays to students for their own experiments.

The public received a chance to see student science experiments designed to fly on the space station as part of the project called Materials on the International Space Station Experiments or (MISSE) on June 8 at the United States Air Force Museum's Kettering Hall. The project is a joint effort between the lab's Materials and Manufacturing Directorate, the Wright Patterson AFB Educational Outreach Office, NASA and Boeing.

The students were challenged to identify one of the problems associated with long duration space flight, and designed a passive experiment that could be used to help solve the problem and could also be used to improve a condition of life on Earth. Sixty ideas from 20 schools were submitted and 28 projects were selected.

"Young people have an amazing talent for using their imagination," said Dr. Wade Adams, chief scientist at the Materials and Manufacturing Directorate. "These students imagined what 'could be' and then changed it into a reality." Students, who ranged from kindergarten to twelfth-grade, received guidance from their teachers and mentors from the Materials and Manufacturing, and Human Effectiveness directorates during the research process.

Students from Incarnation School in Centerville, Ohio said that representatives from the lab demonstrated several environments characteristic of space for them to consider while working on their projects. Scientists used a shaving cream can to demonstrate the properties of a vacuum and liquid Nitrogen to demonstrate the temperature difference in



IMAGINATION, EXPERIMENTS SOAR — Second-grade students from Incarnation School in Centerville, Ohio show off their project that will be included in the materials on the International Space Station Experiment. The students designed passive experiments that will be tested in space over the next three years.

space.

One such project from Incarnation, called "Silly Science," organized experiments that will test the elasticity, bounce and pliability of hot glue, silly putty and caulking when exposed to the space environment for a period of time. In the students' hypothesis they wondered if the substances would change in form due to temperature, radiation, microgravity or vacuum conditions.

During experiments they conducted prior to launch, one second-grade student said, "We took specimens of hot glue, silly putty and caulking, attached them to a clamp, tied weights on the end to see how long it would take them to break." We want to know if [the substances] could be used to fix leaks in space."

Students involved in the project also admitted being curious about whether their silly putty would be "bouncy" after spending time in space.

Cynthia Duckro, a teacher at Incarnation also seemed

visibly impressed by the voracious appetites of her students who “are really just beginning their interest in science. She said she was also impressed by the expertise of Kenny Johnson, Jim Mazza and Brett Bolan from the Materials and Manufacturing Directorate who mentored groups from the school.

Another group of students from HK Ankeny Middle School wanted to know if grain stored in space would remain free of bacteria, insects and fungi.

“We learned about the project about mid-way through the year when our teacher asked for volunteers,” said a seventh-grader from Ankeny. “Since then we’ve looked at samples through an electron scanning electron microscope, done research from the internet and conducted experiments. We’ve decided that [bacteria, insects and fungi] probably won’t show up in our grain because of the vacuum and cold temperatures in Space – there are other factors that we aren’t sure of though.”

Dr. Adams said the experiments would be placed in Passive Experiment Carriers, which resemble a suitcase and will serve as a Space Environmental Exposure Lab. The cases will be launched into space where they will be exposed to ultraviolet, atomic oxygen and radiation effects. The experiments will also be exposed to conditions characteristic of much higher orbits because they will be in space during Solar Max, an active peak of the 11-year sun cycle.

When the projects return from their trip, the Educational Outreach Office will work with mentors and students to analyze the results and complete the research. Student teams will be kept together until projects return by events and activities planned by the Outreach Office.

The projects will be taken to the International Space Station aboard the space shuttle as early as June 2001 and will remain for a period of one to three years. Control experiments will be maintained at Wright-Patterson AFB. @